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Chief, Operations, OSO

10 October 1949

Chief, Communications Division, OSO

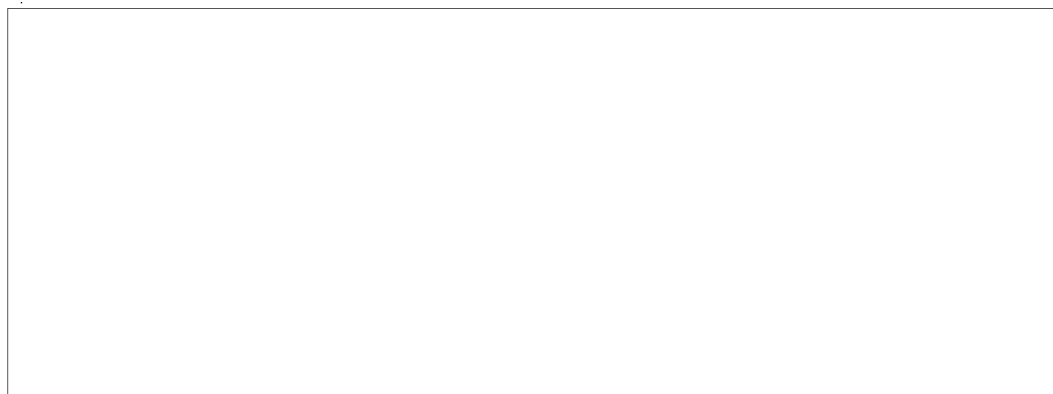
Report on "Electrowriter" Facsimile Equipment

1. In conformance to the terms of our Contract PSC-101-UNV, 25X1

 delivered a prototype of their model EE-1 terminal station "Electrowriter" device. This equipment was developed for us to fill an OSO requirement against OPO funds. The contract provides for the production of 32 units of the model EE-1 base station equipments and 48 units of the EE-1 field station equipments.

2. The "Electrowriter" device consists essentially of an integrated assembly of serve motors and serve amplifiers connected to a pantograph arrangement controlling a stylus bearing an electrically heated element which causes a wax coating on the paper record to be vaporized at the point of contact leaving the blue base of the paper exposed so that a contrasting blue line on a white background is formed. The servos are controlled in the two ordinates necessary for recording by means of a complex electronic system utilizing variable audio tones. In a radio system the "Electrowriters" would be connected through radiotelephone transmitters and receivers (preferably on VHF) and operating under conditions which afford a signal-to-noise ratio of not less than 30 decibels.

3. In evaluating this equipment, it is necessary to make certain assumptions regarding its prospective operational uses. Those are believed to be as follows:



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4. A careful appraisal of the "Electrowriter" system of communication reveals the following:

A. The pantograph linkages should be redesigned to provide means of securing same during transportation.

B. The recording temperature of the waxed-paper and the operating temperature of the stylus should be raised to

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a temperature above 120 degrees F. so that the paper can be safely stored in warehouses during high summer temperatures. At the present time the waxed surface of the paper melts at 100 degrees F.

- C. The circuitry of the electronic portion of the device is highly complex and contains elements unfamiliar to the average radio technician this Agency can put in the field.
- D. The small size of the writing surface (approximately 2-3/4 x 3-1/2) of the present model will seriously limit the use of the "Electrowriter" for transmitting maps and sketches.
- E. [redacted] the "Electrowriter" system would require 750% of the transmitter power and approximately twice the size and weight of transmitters which would be capable of conventional [redacted] operation.
- F. The system presents no particular factors of circuit security. Accordingly, a teletype system is preferred for an order circuit for base radio stations.

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5. In view of the foregoing, it is strongly recommended that OPC review their position in this matter and seriously consider cancelling the production of the 77 units on this contract even though a cancellation penalty is involved. This is based on the precept that the "reliability" factor of the "Electrowriter" is definitely below the minimum necessary to furnish satisfactory communications for the operations of this Agency.

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Comments on the Electrowriter system of communication and in particular on the ES-1.

1. The circuitry of the ES-1 is quite complicated and contains elements that are unfamiliar to technicians available to this agency. This necessitates specialized training to produce competent technicians.
2. The paper supplied with this machine (ES-1) is coated with a wax that melts at about 100 deg F. This temperature is too low for safety in storing of the paper and in application in locations of high ambient temperature.
3. The miniature transmitter, type ET-1, has not been delivered. It is felt that a fairer evaluation could be made with both units available.
4. Furnished with this equipment ES-1 is a commercial electrowriter. There does not appear to be a satisfactory degree of fidelity of reproduction between these units. However these units are not intended to be eventually used together.
5. On small units (up to about 100 watts.) the complete electrowriter equipped station will have approximately twice the size and weight of that of either a 250 wpm CW station or a ~~single~~ double sideband AM fone station with a capacity of about 90 wpm.
6. The maximum rate of intelligence transmission is about 30 wpm for the electrowriter gear, 90 wpm for telephone, and up to about 250 wpm for CW.
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7. Both the electrowriter and the high speed telegraph leave a permanent written record and the telephone equipment could have added with additional size and weight, recording equipment. With CW, the written record would have to be transcribed at a slower rate, say about 30 wpm. So essentially, the difference amounts to a difference in time on the air, not of actual difference in the time of intelligence transmittal.
8. The bandwidth required for the various services depends on the terminal equipment to a large degree. However, with the electrowriter it is fixed at about 4 kilocycles, telephone at about 6 kilocycles, while CW would not exceed 4 kc (250 wpm) under any circumstances.
9. The quoted figure of a necessary 20 db signal-to-noise ratio necessary for proper operation of the electrowriter equipment means that it requires about 750% of the transmitter power required for either a fone or 250 wpm CW circuit.

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